Abstract

Introduction
There is increasing evidence that acupuncture is an effective therapeutic technique for some patients with painful conditions; but, there is ongoing controversy as to whether this effect is primarily due to mechanical or direct effects of acupuncture (verum) or non-specific factors, including placebo (sham).

This paper explores some of the issues involved in differentiating these, including the difficulty in designing a true sham acupuncture technique for investigative purposes; the range of techniques employed in acupuncture; how points to be treated are selected; and the role of placebo in acupuncture delivery.

Conclusion
It is likely that placebo effects contribute to, or enhance, the therapeutic effects of acupuncture; but, the exact mechanism by which verum acupuncture works has yet to be fully elucidated.

Introduction
While acupuncture has been employed as a therapeutic technique for thousands of years, the development of an evidence base to support its use is still a work in progress. Since acupuncture first came to the attention in the West in the early 1970s, there have been numerous published studies on its therapeutic benefit, or lack thereof, with the majority directed towards its role in management of pain. Although the results of a recent large systematic review have suggested that there is a definite therapeutic benefit from acupuncture for pain, the debate is still ongoing about the how acupuncture exerts this effect, with the exact mechanism yet to be defined. Much of this debate relates to whether acupuncture’s effect is due to the precise selection of points to be treated (often termed verum acupuncture), or, alternatively, whether the effects are non-specific and have limited, if any, relationship with precise selection of points (placebo, or sham acupuncture).

Proponents of verum acupuncture generally attribute its effect to one or more of stimulation of superficial Aδ fibres, resulting in the inhibition of painful stimuli from the periphery; activation of descending pain control systems in the mid-brain; and release of β-endorphin and met-enkephalin in the brain and spinal cord. Yet, none of these appear to be specific for acupuncture point selection based upon Traditional Chinese Medicine approaches. More recent work has suggested alternative mechanisms, including modulation of the subcortical fascial network, and neural blockade; but as yet, there is no uniformly accepted mechanism. In contrast, the proponents of sham acupuncture attribute its effects to non-specific factors, including underlying psychological factors, expectation and a general “placebo” effect.

To attempt to answer the question whether acupuncture is a non-specific placebo or a specific therapeutic intervention, the reader will need to understand the difficulty in designing a true sham acupuncture technique for investigative purposes, the range of techniques employed in acupuncture, how points to be treated are selected and the role of placebo in acupuncture delivery.

Discussion
The author has referenced some of his own studies in this review. These referenced studies have been conducted in accordance with the Declaration of Helsinki (1964), and the protocols of these studies have been approved by the relevant ethics committees related to the institution in which they were performed. All human subjects, in these referenced studies, gave informed consent to participate in these studies.

Challenges in sham acupuncture delivery
Although, to this point, the terms verum and sham have been used in an exclusive manner, the practical distinction between these two terms—when applied to acupuncture—is not clearly defined. Clinical trials comparing verum and sham acupuncture frequently employ very similar techniques, including the use of needles. Although earlier trials have compared the points described during acupuncture performed at Traditional Chinese Medicine (as verum) with acupuncture at other skin sites (as sham), recent research suggests that acupuncture point localisation is not uniform between practitioners, and that this lack of precision may contribute to the variability in trial outcomes. Some trials have utilised modified needles, or needling with minimal pressure as sham, but the lack of a generally-accepted mechanism as to how acupuncture works has resulted in uncertainty in interpreting the results of these trials.

Acupuncture modalities
In addition to the widely known practice of inserting fine needles into designated skin points (the technique by

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which acupuncture obtained its English language name)\(^1\), and electroacupuncture, in which electrical stimuli are applied to the inserted needles, a range of therapeutic techniques may be used to treat these points. Perhaps, the most interesting point here is the use of low-level laser on acupoints, which, despite being imperceptible, results in identical clinical outcomes to those of needle acupuncture\(^1\). While there are potential concerns with blinding techniques when attempting sham acupuncture with needles, these concerns may be overcome by comparing verum laser treatment of acupuncture points with sham laser in which a coloured light is emitted from a laser probe, simulating low-level laser\(^1\). This type of research holds considerable promise for potentially teasing out the difference between verum and sham acupuncture, as both acupuncturist and patient are blinded to the nature of light emitted. Outcomes of trials of this type have yet to be published, but the author’s personal experience and knowledge of preliminary unpublished results of such a trial suggest that there may be a significant difference in outcomes between these two groups.

Another interesting form of acupuncture that is not widely practised in the West is the application of capsaicin to acupuncture points\(^20\). Capsaicin has a unique property of exerting its clinical effects by blocking small unmyelinated cutaneous afferent nerves\(^21\), in contrast to needle acupuncture, which is widely considered to stimulate large myelinated different nerves\(^2\). Nonetheless, capsaicin applied to acupuncture points appears to result in similar outcomes as in needle acupuncture, which suggests that it is the points themselves, and their selection, that may differentiate verum from sham treatment.

**Acupoint selection and specificity**

Historically, many sham acupuncture trials have attempted to compare conventional needle acupuncture with a sham non-penetrating needle at identical acupoints; while others have compared similar techniques at random skin sites\(^4\). This begs the question whether the traditional concept of an acupuncture point does indeed exist, and what, if any, is its significance. Notwithstanding the fact that there is a considerable variation between practitioners in localisation of individual points\(^13\), the lack of understanding of acupuncture’s mechanism and whether this is point-specific has hampered ongoing efforts in defining acupoint relevance. Recent neuroimaging research appears to indicate that there is, indeed, a difference in cerebral activation patterns between acupuncture at verum points and random skin\(^22\), but there is a need for further work in this area. Interestingly, recent research suggests that the traditional Chinese concepts of meridians linking acupuncture points may have physiological correlates\(^23\). Hence, there is tantalizing evidence suggesting that acupuncture points are associated with specific clinical effects, but the lack of understanding of how acupuncture actually works has hindered widespread acceptance of the specificity of clinical effect of these points.

**Expectancy and placebo effects**

Despite the long and ongoing effort to attempt to understand the mechanism of acupuncture at a peripheral cutaneous/spinal cord level, there is still insufficient evidence to enable its physiological elucidation. In contrast, there is substantial published evidence indicating that patient expectations influence clinical response to acupuncture, supporting the notion that acupuncture involves a significant placebo effect\(^24,25\). Exactly how this placebo effect is mediated remains the subject of ongoing investigation, but it appears to relate, at least in part, to use of an empathetic approach when administering acupuncture\(^4\). Indeed, there is some preliminary evidence to suggest that when comparing verum and sham acupuncture, functional connectivity between brain regions is differentially modulated by expectancy levels\(^26\). Yet, these effects are insufficient to fully explain the degree of clinical improvement following acupuncture\(^3\), suggesting that any expectancy effect is additive to the effects of verum treatment.

**Conclusion**

Evidence certainly suggests that verum acupuncture may be more effective than sham acupuncture for certain painful conditions. There is, however, little doubt that placebo effects modulate the therapeutic effect of acupuncture. Further work will be required to elucidate both how the type of sham treatment (such as empathetic approach and non-specific point needling) and acupuncture modality (including needle, laser and electroacupuncture) interact to result in clinical improvement.

**References**


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